



PETROLEUM INFRASTRUCTURE ENVIRONMENTAL PERFORMANCE REPORT

June 20, 2005



Purpose of Workshop

- Provide overview of PIEPR report
- Receive comments on report
 - After each issue area and at end
- Identify where additional data may reside
- Identify actions being taken by others regarding petroleum infrastructure
- Review policy options for the Energy Commission

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Purpose of Report

- Assess nature and extent of environmental, public health, and safety issues associated with petroleum infrastructure
- Determine trends over the past 15-20 years
- Evaluate how trends may change with changes/expansion to petroleum infrastructure facilities

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Report Organization

- Discusses terminals, refineries, pipelines and bulk storage
 - Does not address production, distribution or retail sales
- Takes regional approach wherever appropriate
- Provides background on infrastructure history and operations, needed expansions
- Analyzes impacts by environmental issue areas
- Presents findings and policy options

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California's Oil History

- Drilling – started in 1862
- Distribution – first pipeline built in 1886
- Processing
 - 20 barrels of oil/day in 1876 to one million barrels of crude oil/day in 2000s
 - Some refineries built in early 1900s still on same site

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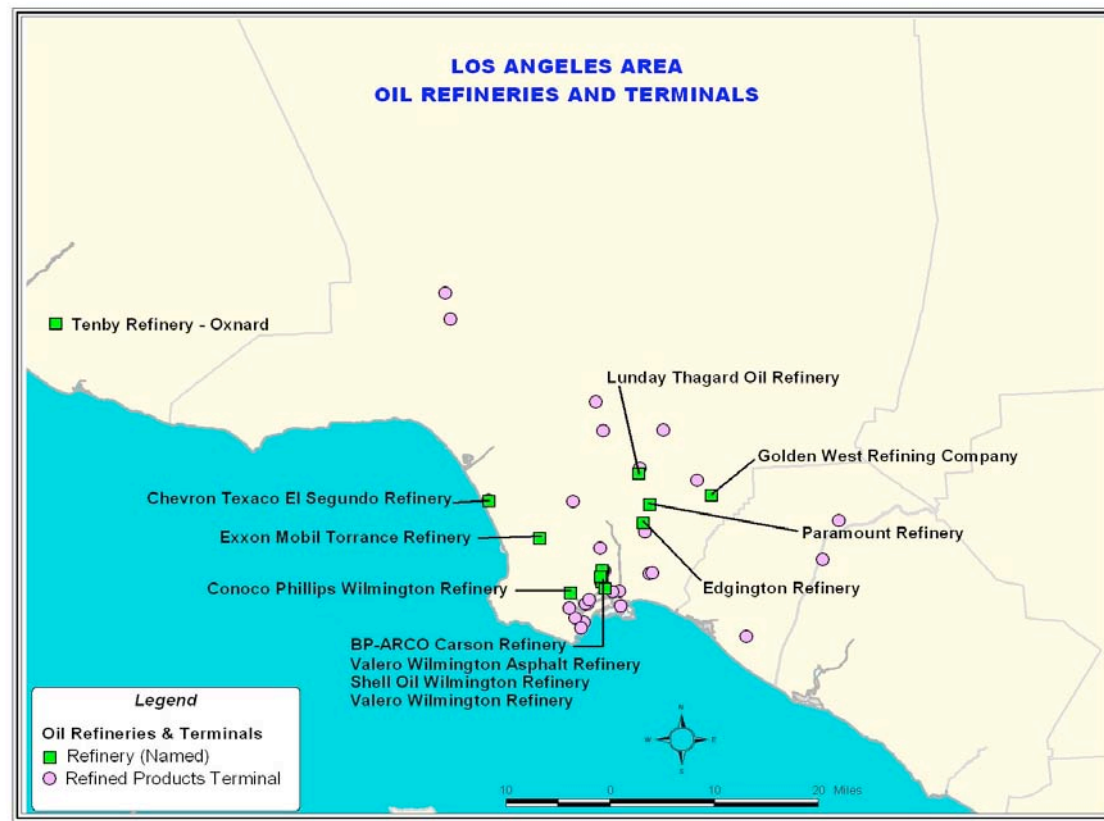
Infrastructure Ownership and Locations

- Mergers, divestitures, acquisitions have consolidated facilities
- Number of refineries has decreased 40%
- No new refineries since 1969
- Refinery throughput has decreased 20%
- Major infrastructure located in Los Angeles, San Francisco Bay Area
- Minor infrastructure in Bakersfield, Santa Maria

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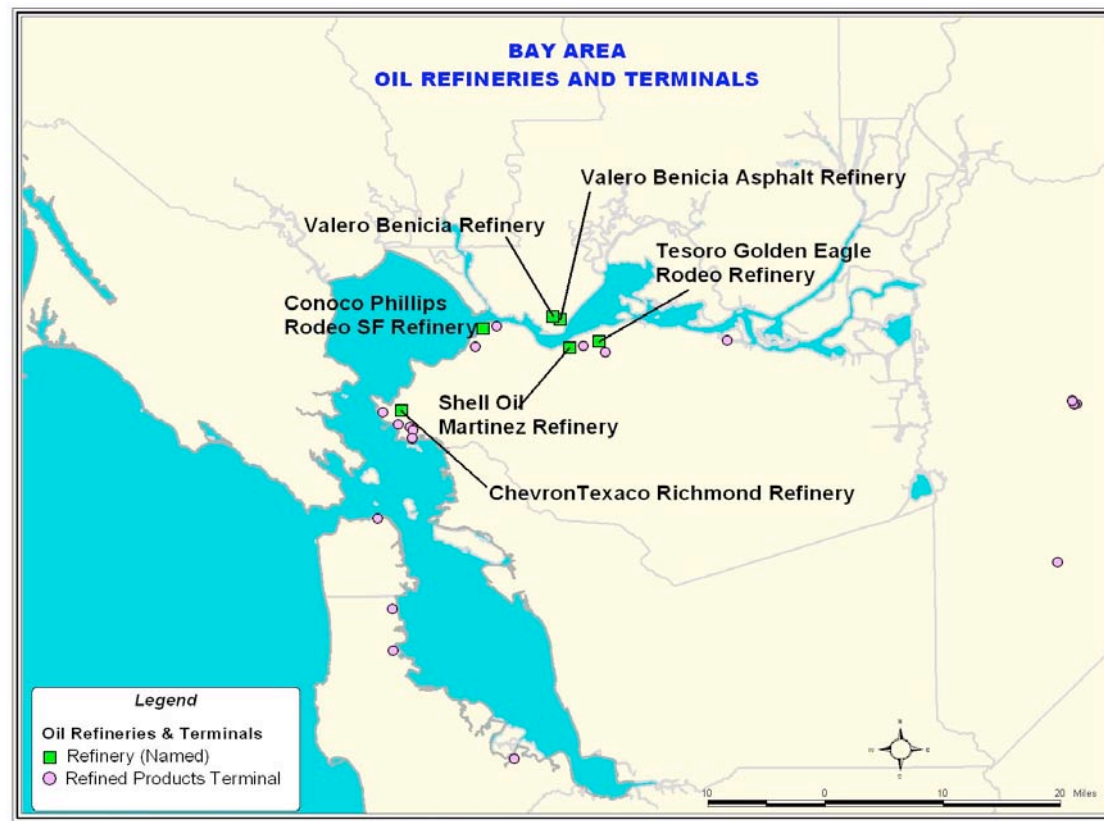
Los Angeles/Long Beach Petroleum Infrastructure



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San Francisco Bay Area Petroleum Infrastructure



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Infrastructure Changes

- Past and Future Drivers: Regulations on Reformulated Gas, MTBE, Ethanol, ULSD
- California now a “fuel island”
- Growing demand for transportation fuels necessitates more infrastructure
- Additional storage and marine terminal receipt points needed

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Land Use

- Infrastructure once rural, now located in urban areas
- Separation distances to residential areas may not be adequate
- Zoning Laws, CEQA began in 1970s
- Existing/potential conflicts with communities, agencies, competing land uses

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Infrastructure Expansions Could Increase Conflicts

- Land available for port/refinery expansions is limited
- Ports may prefer expansions of cargo containers
- Expansions may not be compatible with local land use plans, community desires
- Mainly “fence-line” changes??

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Aids to Help Resolve Conflicts

- ARB guidance to local communities for siting decisions for sensitive land uses near industries
- American Petroleum Institute guidelines for setbacks
- Development of model ordinances, planning policies, General Plan safety/environmental justice elements

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Environmental Justice

- Federal and State guidelines in place
- Address disproportionate impacts on minority/low-income populations
- Some air districts, counties have developed EJ policies and programs
- Designed to work with local communities on issues of concern

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Demographic Changes within Six Miles of Refineries

- Percentage of minority populations has grown from 1980 to 2000
 - Los Angeles/Long Beach: 45% - 71%
 - San Francisco Bay Area (avg): 30% - 55%
- Change in Low-Income Populations less dramatic
 - Los Angeles/Long Beach: 13% - 19%
 - San Francisco Bay Area (avg): 9.3% - 9.0%

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Community Concerns

- Disproportionate share of impacts
- Cumulative health effects of toxic chemical releases
- Flaring of gases
- Monitoring and reporting of refinery emissions, agency enforcement
- Accidents, notifications, evacuation plans
- Work with local agencies

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Air Quality

- Emissions generally controlled by regulations
- Air emissions from upset events and flaring at refineries of concern to public
- Infrastructure emissions a relatively small portion of State-wide inventory
- Represent a larger portion of regional inventory

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State-Wide Changes

- Petroleum sector emissions have decreased from 1975 to 2004
- NO_x & PM₁₀ emission reductions are due to fuel change in boilers, air pollution control technology
- High levels of NO_x, SO_x and PM₁₀ from marine terminals are due to diesel port equipment, truck and rail traffic and unregulated marine vessels

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Refinery Emissions

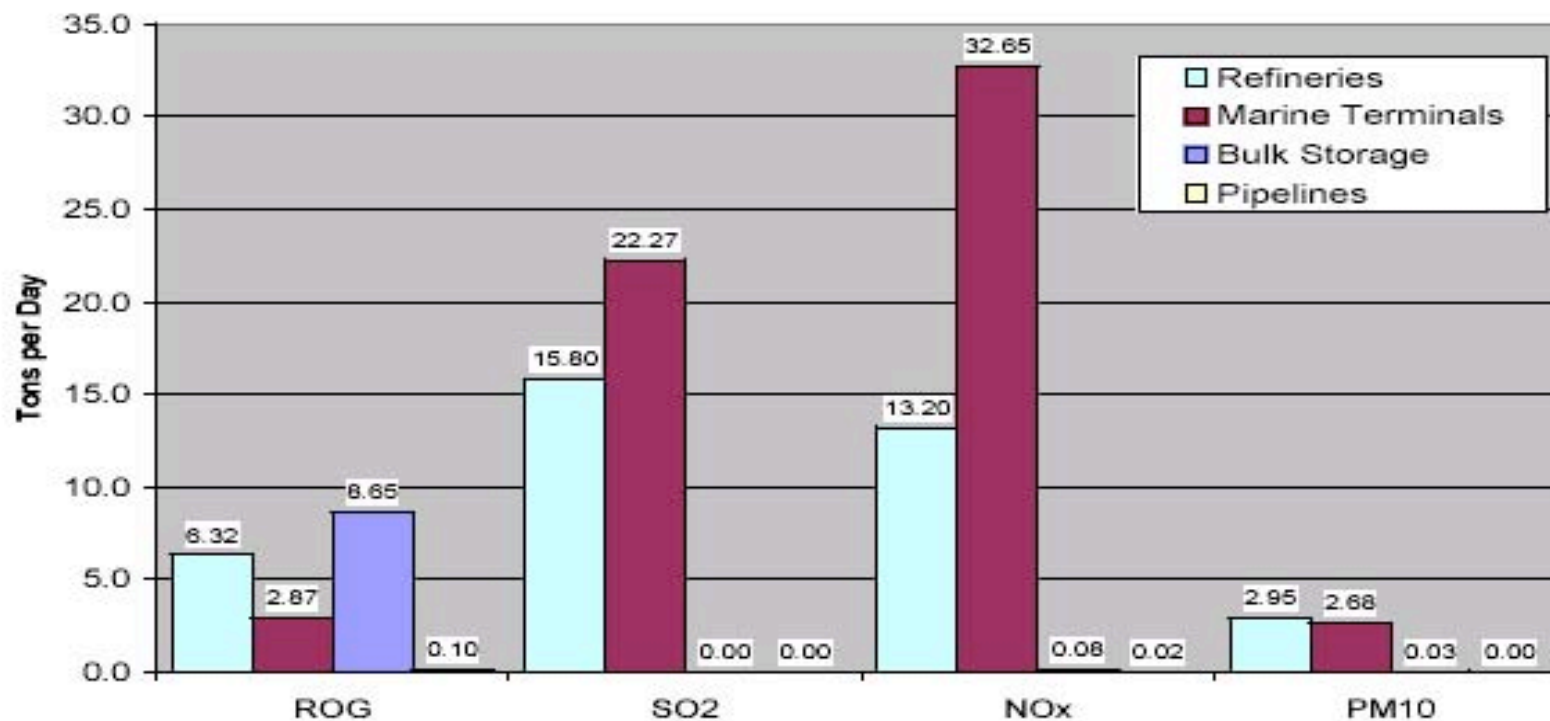
- Refinery capacity located in six air districts
 - Bay Area, South Coast, San Joaquin, Ventura, San Luis Obispo County, Santa Barbara County
- 80% of the California population located in these six districts
- South Coast, Bay Area & San Joaquin comprise 98% of refinery capacity
- Emissions vary by petroleum sector and by air district (note scale differences on next slides)

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South Coast Emissions

Figure 5-8: South Coast Petroleum Infrastructure Sector Emissions of Four Major Air Pollutants (tons/day)



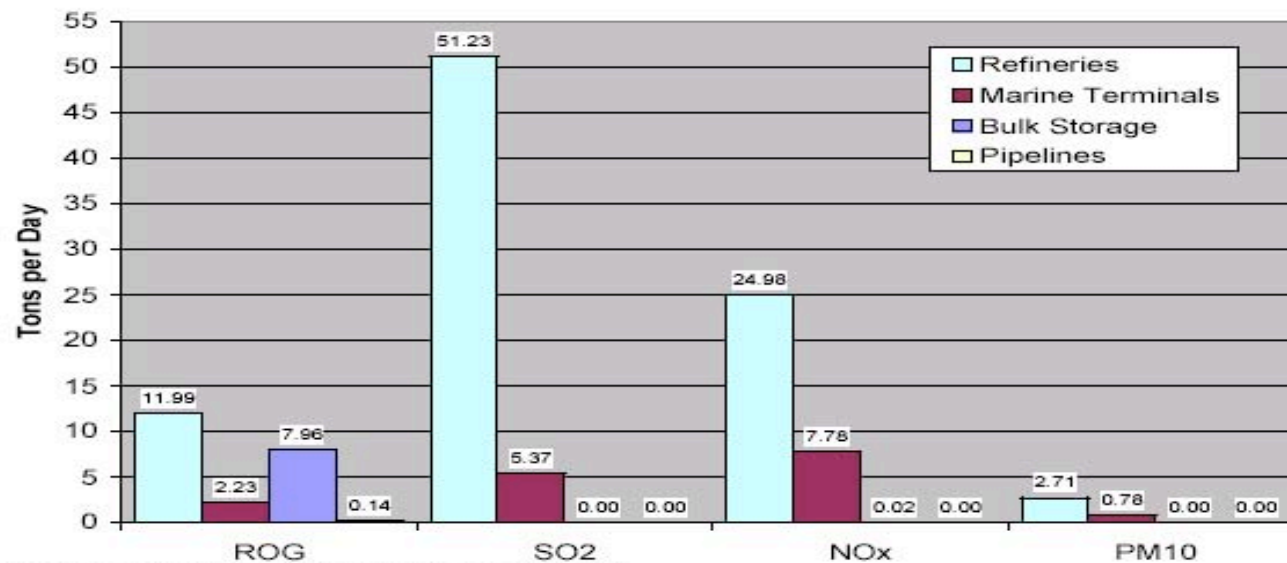
Source: Air Resources Board California Emissions Inventory Development and Reporting System (CEIDARS) database, 2002 inventory year

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SF Bay Area Emissions

Figure 5-9: Bay Area Petroleum Infrastructure Sector Emissions of Four Major Air Pollutants (tons/day)



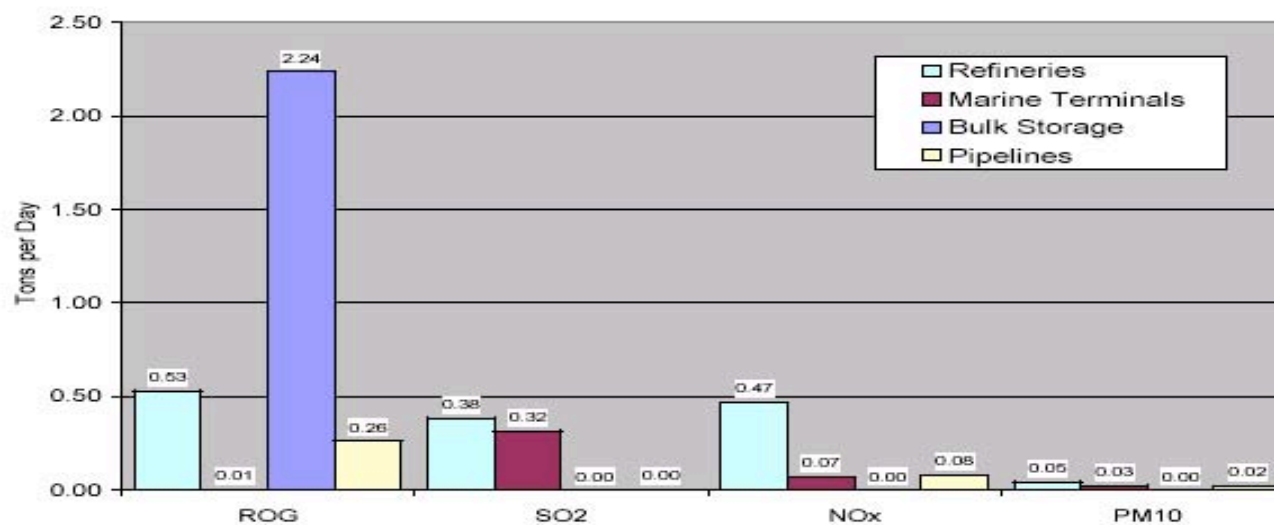
Source: Air Resources Board California Emissions Inventory Development and Reporting System (CEIDARS) database, 2002

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San Joaquin Valley Emissions

Figure 5-10: San Joaquin Valley Petroleum Infrastructure Sector Emissions of Four Major Air Pollutants (tons/day)



Source: Air Resources Board California Emissions Inventory Development and Reporting System (CEIDARS) database, 2002

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Future Trends

- Emission levels generally expected to be flat over next 15 years
- San Francisco Bay Area projecting increases; likely due to differences in how emissions are calculated
- Continuing efforts by air districts to address community concerns
- New rules and new technologies to collect data

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Public Health Impacts of Toxic Pollutants

- Air toxics emitted from process emissions, fugitive emissions, combustion processes
- Diesel particulate matter emissions of most concern with respect to health
- Except for one refinery, process emissions do not increase cancer/noncancer risks
- Upset/fugitive emissions not quantified

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Combustion Process Emissions From Ships/Flaring

- Diesel PM is most significant air toxic in California
- Marine terminal sector (ships) contribute most of petroleum infrastructure diesel PM
- Diesel PM in Ventura/Santa Barbara is 30% and 60% of Inventory
- Diesel PM from marine vessels could increase if uncontrolled
- Flaring emissions have declined

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Safety and Hazardous Materials Management

- Hazardous Materials – includes raw materials, and process materials (by-products, in-process, end-products)
- Regulations primarily to inform public and emergency responders
 - Risk Management Plans (RMPs) identify hazards
 - Administered by local agencies
- Process Safety Management (PSM) for worker protection
 - Administered by Cal/OSHA

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Releases to Public

- Accidental release database shows 18 releases from 1990-2003; no public impacts
- Two pipeline incidents from 1980-1989 caused injuries and fatalities
- 1994 refinery release (200 tons of airborne corrosive solution) caused health impacts to community
- Contra Costa County with 14 “shelter-in-place” events from 1993-2003; no reported injuries

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Future Trends

- Increase in refinery throughput suggests increasing importance of PSM
- Integrate PSM with hazardous materials regulations
- Need to address risks from releases from terrorism/sabotage
- Need for timely info/better communication should releases occur

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Hazardous Waste Generation and Management

- Hazardous Wastes – materials that have served intended purpose and may cause injury, illness, or harm to people or the environment
- Looked at recurring and nonrecurring wastes
- Availability, character, and utility of data limit the analysis

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Recurring Waste Generation and Disposal

- Refineries considered by DTSC to be one of State's largest generators
- General reduction in HW from 1990-1998 but overall amount generated and reduced by all refineries is not known
- Refineries contribute 5-7% of HW disposed offsite
 - 7-16% of landfilled wastes
 - 2-5% of incinerated wastes
- Lack of data on recycling, other treatment options

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Nonrecurring Wastes

- Half of refineries with subsurface pollution
- Cleanups are ongoing
- Gap between regulatory policy and what can be practicably attained
- Potential for future spills limited by regulations, process changes and new technology

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Water Quality and Supply

- Regulatory framework addresses surface water, groundwater, soils and sediments
- Refinery sector uses most water; use has declined since 1992 but still significant
- Wastewater primarily from cooling water blowdown, boiler feed water and process wastewater
- Disposal to wastewater treatment plant (20-40 gal per barrel of crude refined)

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Impacts to Water Bodies

- Dredging creates resuspended solids
 - Impacts from both physical and chemical factors
- Crude oil and refined product spills
- From 1973-1993, 170,000 oil spills in U.S.
 - 90% less than 100 gallons
- Technology improvements limit spills
 - Double-hulled tankers; navigation systems for ships and ports

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Future Trends

- Increase in crude oil imports could increase oil spill potential
- Opportunities for optimizing water use
 - Alternative cooling methods
 - Increased use of recycled water

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Biological Resources

- Infrastructure put in place prior to environmental regulations (NEPA, CEQA, Endangered Species)
- Difficult to quantify historical impacts
- Proximity of infrastructure to sensitive areas varies
 - LA predominantly urban
 - SF near marshes, grasslands
 - Bakersfield/Santa Maria near grasslands, dunes, agricultural land

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Resource Impacts

- Ballast water discharges have introduced nonindigenous species, chemicals, contaminants
- Hull fouling also introduces species
- Dredging disturbs marine floor; suspended particles affect aquatic life
- Oil spills, while declining in number and volume, cause long and short-term impacts

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Future Expansions

- Construction activities may disturb resources
- Dredging needed in San Francisco Bay
- Regulatory framework in place to mitigate impacts
- State Lands Commission efforts should reduce ballast water/hull fouling impacts

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Policy Options

- Expand partnerships
- Provide timely information on need and plans for petroleum infrastructure
- Sponsor Studies to Develop Tools to Help Address Community Concerns
- Work with DTSC to identify opportunities for reduced energy use and waste generation, increased recycling, use of waste material (e.g., petroleum coke) to generate energy

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Policy Options Cont.

- Support Air Resources Board efforts
 - Siting criteria for local communities
 - Efforts to reduce particulate matter emissions from shipping
- Work with Air Districts, ARB to resolve differences in methodologies to calculate air emissions

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